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HOUSE ANTS: KINDS AND METHODS OF CONTROL.[1]

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CONTENTS.

	Page.
Introduction	1
Kinds of North American house ants	3
Introduced tropical Old-World ants	3
Introduced tropical New-World ants	6
Native North American ants of temperate regions	7
Garden and lawn ants as house pests	8
Habits and life history of house ants	9
Means of controlling house and lawn ants	10
Destruction of house colonies	10
Destruction of lawn ants	12
Protection from the carpenter ant	12

INTRODUCTION.

There are now in North America a considerable number of species of ants which under favoring conditions may inhabit dwelling houses or other heated buildings, constructing their nests and breeding continuously in the woodwork or masonry, or in articles of furniture or of ornament, and subsisting on food materials which they find about kitchens and pantries or scattered in living rooms. Other species nesting in gardens and lawns or under adjacent walks may occasionally enter houses as foragers or as accidental guests.

It is interesting to note that, of the ants which in North America frequent houses and construct their nests therein, practically all are of tropical origin, and most of them are Old-World species.

[1] The authority for the scientific names and the source of many records of the less well-known house ants given in this bulletin is the notable work on American ants by Dr. W. M. Wheeler, entitled "Ants: Their Structure, Development, and Behaviour" (1910). Dr. Wheeler has also read the text of this bulletin and furnished some notes not available in print.

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It is a matter of further interest that, with the exception of the European meadow ant, practically all of the ants which have been introduced into North America, either from the Old World or from South America, are such tropical species and potential house pests. All of these introduced species have been brought to North America and many of them given cosmopolitan distribution through the agency of commerce. The tropical ants in their native countries are still normally outdoor species, although in the Tropics they also frequent human habitations, including ships, and, by colonizing in ships' cargoes, are easily given world-wide distribution. Some of

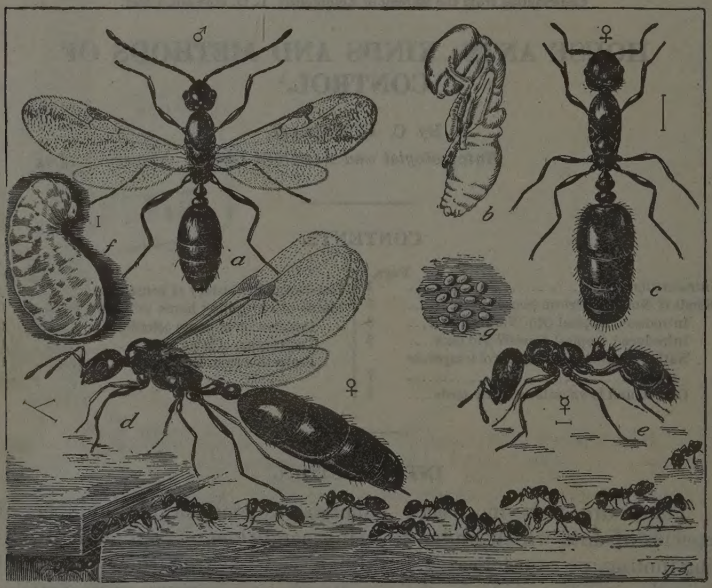

FIG. 1.—The little black ant (*Monomorium minimum*): *a*, Male; *b*, pupa; *c*, female; *d*, same with wings; *e*, worker; *f*, larva; *g*, eggs; group of workers in line of march below. All enlarged, the lettered illustrations all drawn to the same scale. (Original.)

these Old-World species have become established as out-of-door species in the New-World Tropics, but in temperate regions they are able to survive only in dwellings, hothouses, mills, or other structures where the requisite warmth is maintained. The ability of these imported tropical species to maintain themselves is largely due to the protection from competition with our native species afforded by this house-dwelling habit.

None of these ants, with the exception, in rare instances, of the carpenter ant, are so destructive to household effects or supplies as they are annoying from the mere fact of their presence and their

faculty of "getting into" articles of food, particularly sugars, sirups, cakes, candies and other sweets, and cooked foods of animal origin. Having once gained access to articles of this sort, the discovery is at once reported to the colony, and in an incredibly short time the premises may be swarming with these unwelcome visitors.

KINDS OF NORTH AMERICAN HOUSE ANTS.

The different kinds of North American house ants may be grouped on the basis of origin as follows: (1) Tropical Old-World ants, represented by 12 species; (2) ants introduced from the New-World Tropics, represented by 5 species; (3) native North American ants of temperate regions which occasionally inhabit dwelling houses, represented by 2 species; and (4) such occasional garden and lawn ants as may from time to time become accidental house pests by extending their forays into dwelling houses in quest of food, of which 4 native North American species are discussed, and also the introduced European meadow ant.

INTRODUCED TROPICAL OLD-WORLD ANTS.

The little red ant,[1] or Pharaoh's ant (fig. 2), is the best known house species. It has attained a thoroughly cosmopolitan distribution and has been domesticated so long that it is now difficult to determine its exact origin, except to place it generally in the Old-World Tropics. It was originally a soil ant, nesting out of doors in warm countries, and doubtless continues this habit in the tropics of both hemispheres. In temperate regions it passes its entire existence in heated houses.

Three other species of the same genus of Old-World tropical ants are recorded as having been brought to our shores and as having gained foothold, occasionally in dwellings.[2] None of these species have, however, so far established any important record in this country as house pests, although they may be expected to appear at any time in dwelling houses and other heated structures, particularly in the southern United States, and possibly farther north along the Atlantic seaboard. One of these, *Monomorium salomonis*, is stated to be the most abundant of North African ants, and to have been widely distributed by commerce and to occur in most tropical and subtropical countries. A native species of the same genus,[3] known as the little black ant, is referred to elsewhere.

Two Old-World agricultural or harvester ants[4] have been brought to this country by commerce and are now fairly well established in

[1] *Monomorium pharaonis* L.

[2] *Monomorium salomonis* L., *Monomorium destructa* Jerdon, and *Monomorium floricola* Jerdon.

[3] *Monomorium minimum* Buckley.

[4] *Solenopsis geminata* Fab. subspecies *rufa* Jerdon and *Pheidole megacephala* Fab.

tropical America, and are potential house pests. One of these, *Pheïdole megacephala*, was formerly the important house ant of Madeira, occurring in prodigious numbers throughout the southern portion of the island and up to an elevation of 1,000 feet, nesting out of doors under nearly every stone, and in houses generally. It is stated also that this ant is very common in the Bermudas and West Indies and will probably be found in Florida, and that wherever it gains foothold in subtropical countries it is able to propagate very rapidly and

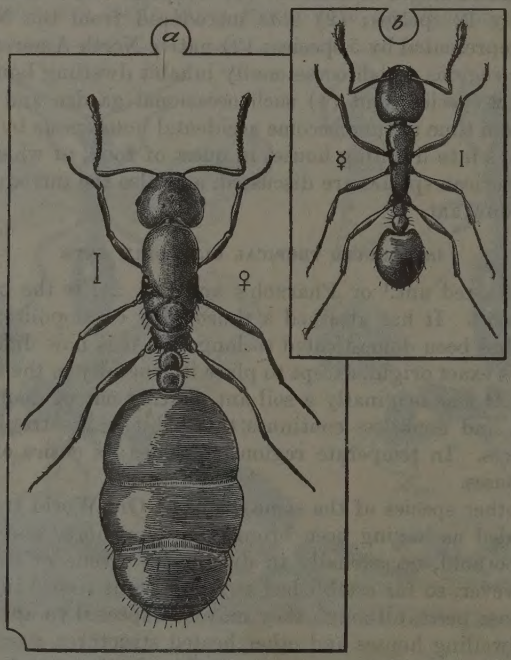

FIG. 2.—The little red or Pharaoh's ant (*Monomorium pharaonis*); *a*, Queen or female; *b*, worker. Both drawings enlarged to the same scale. (Original.)

to exterminate the indigenous ant fauna; in fact, several instances of this kind have been noted. This ant, on the other hand, has itself lately been driven out and practically exterminated in Madeira by the Argentine ant,[1] which latter ant has also, in New Orleans and elsewhere in the United States, similarly displaced our native ants. As North American house ants, however, neither of these Old-World harvester ants has so far assumed any importance, although both probably occur in Florida.

[1] *Iridomyrmex humilis* Mayr.

Six other Old-World tropical ants have been recorded as introduced house-infesting species in North America.[1] These, like other Old-World ants, have been brought in through the agency of commerce and have gained foothold in tropical America and are occasionally found nesting in hothouses and other heated structures in temperate regions.

One of these ants, *Prenolepis longicornis*, a slender, black species with unusually long legs and antennæ or "feelers," has earned the common name of "crazy ant" from its habit of running about, usually singly and apparently aimlessly, with a quick, jerky motion. This ant has long been a common species in the greenhouses of temperate Europe and America, and in some of these, as in the Jardin des Plantes in Paris, it has been a permanent resident for more than 40 years. It has acquired a footing in tropical Florida, and probably also in other localities in the Gulf States, and has been reported as infesting, even to the top floors, large apartment build-

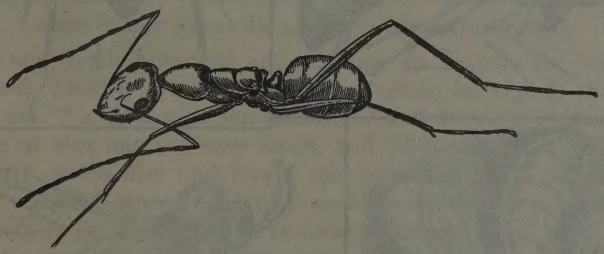

FIG. 3.—An introduced tropical Old-World ant, *Plagiolepis longipes*. Enlarged. (After Wheeler.)

ings in New York City, and also as occurring in hotels and flats in Boston. It is a common house ant in the District of Columbia. India is believed to be the original home of this ant, whence it has been carried to all tropical countries in ships, and it has been accompanied in its wanderings by three insect messmates, namely, two beetles and a small cricket.

A related species, *Prenolepis vividula*, is a common greenhouse pest in Europe and is reported as having been found in greenhouses in this country; in one instance as far north as Canada. Another of these Old-World ants, *Plagiolepis longipes* (fig. 3), will probably ultimately come into prominence as a house species on this continent. Its original home is given as Cochin China, but it has already established a foothold in widely separated parts of the world. On the island of Reunion, for example, it is very abundant and is reported to be driving out some of the primitive species. It has also been recorded on this continent from Todos Santos, Lower California.

[1] *Tetramorium guineense* Fab., *Tetramorium simillimum* Roger, *Tapinoma melanocephalum* Fab., *Prenolepis longicornis* Latr., *P. vividula* Nyl., and *Plagiolepis longipes* Jerdon.

INTRODUCED TROPICAL NEW-WORLD ANTS.

Of the ants introduced into North America from the New-World Tropics the one of greatest economic importance is what has now come to be generally known as the Argentine ant (fig. 4)[1] from its supposed Argentine origin. It is known, however, to be a serious pest in Brazil and Uruguay, as well as in Argentina. It is sometimes also called the New Orleans ant, from the fact that it gained its first foothold from colonies brought in, presumably from Brazil,

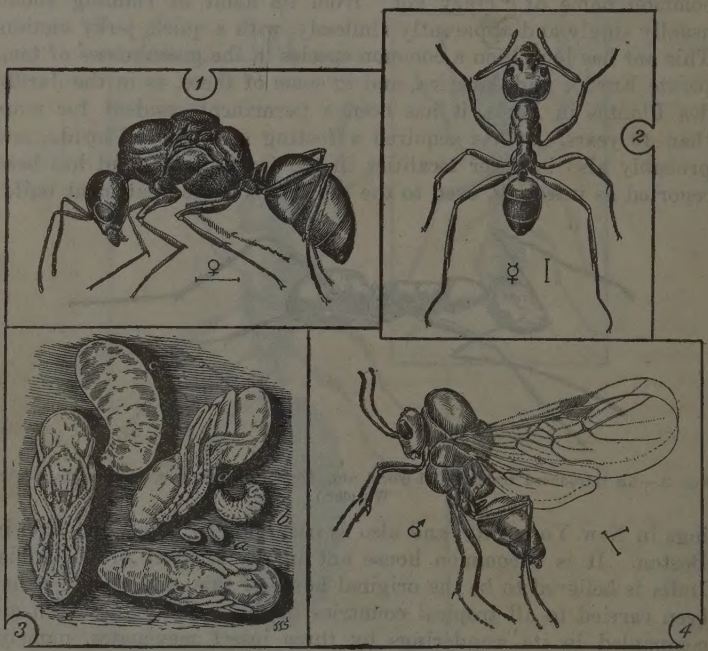

FIG. 4.—The Argentine ant (*Iridomyrmex humilis*). *1*, Wingless female. *2*, Worker. *3*, Immature stages: *a*, Eggs; *b*, young larva; *c*, full-grown larva; *d*, pupa, side view; *e*, pupa, ventral view; *f*, pupa, dorsal view. *4*, Male. All enlarged to the same scale. (Original.)

by some ships' cargoes to the port of New Orleans. It is a much worse house pest than even the little red ant or any of the other house ants and is in addition a very serious enemy of field and garden crops and orchard trees. It has rapidly spread from the point of introduction throughout Louisiana and has been carried by traffic to California, where it has become a serious pest in citrus orchards in the southern part of the State, and in houses as far north as San Francisco. It is undoubtedly destined to extend its outdoor range

[1] *Iridomyrmex humilis* Mayr.

wherever climatic conditions permit and as a house and greenhouse pest over a much wider area. Its rôle as an exterminator of native ants in the New Orleans district and in the island of Madeira has already been referred to. It is the only one of the imported tropical ants which causes any large monetary losses. The other species, as elsewhere noted, are for the most part merely annoying.

Four other species of ants from tropical America have gained, through the agency of commerce, some foothold as house pests in the southern and eastern United States, and manage to live for considerable periods of time in northern heated houses.[1]

One of these, *Prenolepis fulva* subspecies *pubens*, has been recorded from the District of Columbia, where it was found infesting one of the hothouses of the Department of Agriculture. It is believed to be a native of Brazil, but now occurs quite abundantly in Cuba and other West Indian Islands. It is still a comparatively rare house pest, however, in temperate regions of North America, and, except in the Tropics, undoubtedly can not survive outside of heated buildings.

NATIVE NORTH AMERICAN ANTS OF TEMPERATE REGIONS.

Only one North American ant of temperate regions has become a true house dweller and pest. This distinction belongs to the little "thief ant,"[2] a native of our Northern and Eastern States. The workers of this ant are very small, and yellowish in color. They frequently, as do also Old-World species of the genus, inhabit the gallery walls of other and larger ants, where they are apparently unnoticed, and kill and eat the helpless larvæ and pupæ of their apparently unconscious hosts. The thief ant may, however, lead an independent existence, and has been reported as a frequent pest in dwellings. It feeds on any animal matter, including dead insects, and has been recorded as attacking the sprouting kernels of Indian corn. This species can be readily distinguished from the little red, or Pharaoh's, ant by its much lighter color and smaller size.[3] This species is reported by C. H. Popenoe, of the Bureau of Entomology, United States Department of Agriculture, as nesting in houses very much as does the little red ant, colonies of the thief ant having been found, for example, in an envelope, and again in a box of photographic dry plates.

The carpenter ant[4] (fig. 5) should be considered in the list of house ants, although perhaps only accidentally, and under exceptional circumstances, a house-infesting species. The carpenter ant of North America, a subspecies or variety of the European and Asiatic

[1] *Prenolepis fulva* Mayr subspecies *pubens* Forel, *Neoponera villosa* F. Smith, *Camponotus abdominalis* Roger subspecies *floridanus* Buckley, and *Pheidole flavens* Roger subspecies *floridanus* Emery.

[2] *Solenopsis molesta* Say.

[3] It is further distinguished by the possession of very rudimentary eyes, and a two-jointed instead of three-jointed "club" to the antennæ.

[4] *Camponotus herculeanus* L., subspecies *pennsylvanicus* De G.

species of the same name, is dark brown or black in color, and is the largest of the house-frequenting ants, the workers varying from one-fourth to one-half inch in length and the winged female attaining a length of nearly an inch. It normally constructs its galleries in logs and dead trees in forests, but not infrequently, in the case of wooden houses, and especially those in or near forested tracts, gains access through porch beams or the underpinning of such houses and mines and weakens the supporting timbers and other woodwork. As a rule it affects only the decaying portions of the wood, but sometimes carries its channels into the sound wood. Many instances of damage of this sort have been reported, possibly some of them,

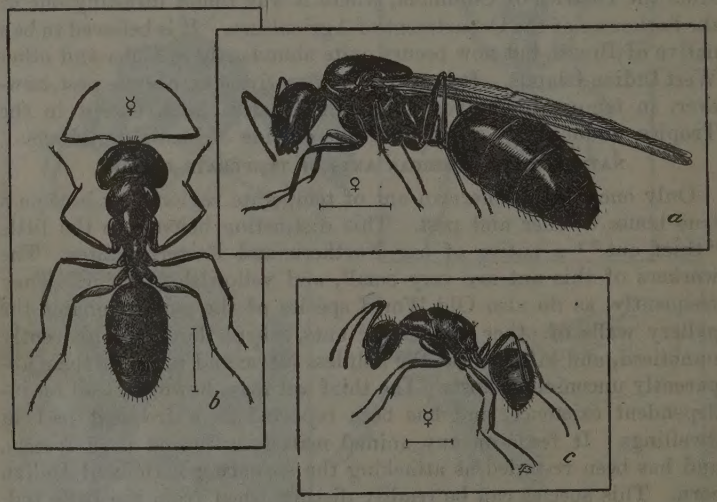

FIG. 5.—The carpenter ant (*Camponotus herculeanus pennsylvanicus*): *a*, Winged female; *b*, worker major; *c*, worker minor. All enlarged to same scale. (Original.)

however, due to confusion of the work of this ant with that of the common termite or so-called white ant.[1]

GARDEN AND LAWN ANTS AS HOUSE PESTS.

Almost any of the common garden or lawn ants which build their little crater nests in lawns or in soil about houses may become temporarily or on occasion house pests in their search for food substances. Four native ants and one introduced species have achieved notoriety in this way.[2] One of these, referred to in earlier circulars issued by this department on house ants as the little black ant[3]

[1] *Leucotermes flavipes* Kollar.

[2] *Monomorium minimum* Buckley, *Lasius niger* L. var. *americanus* Emery, *Prenolepis imparis* Say, and *Formica fusca* L. var. *subsericea* Say.

[3] *Monomorium minimum* Buckley.

(fig. 1), is essentially a lawn or meadow ant, and its entrance into houses is due to chance or accident. Its small nests, with the opening surrounded by its protecting wall of fine grains of soil, can be frequently noted in lawns, and if these nests are opened the colonies will be found to consist of workers, with one or more much larger gravid females. When these or other lawn ants gain access to houses, attracted by food supplies, the nuisance can often be eliminated by tracing them back to their outdoor colony and destroying the latter, as hereinafter described.

Perhaps the most abundant and widespread lawn or garden ant is a small yellowish-brown species which may be given the common name of the American lawn ant.[1] Its crater nests are exceptionally abundant throughout the Northern States, and not infrequently a dozen or more nests may occur on a square yard of lawn surface. In addition to the fact that it occasionally gains entrance to houses and becomes annoying as a depredator on larder supplies, it is a lawn and garden pest of some importance; and, furthermore, has the reputation of hoarding over winter the eggs of aphids and colonizing the young aphids in the spring on their host plants, thus becoming a very important factor in increasing the damage to garden and field crops by these injurious insects. In the case of lawns and meadows, aside from the harboring of injurious aphids, direct injury from this ant is probably negligible, or is offset by the actual benefit which may result from the bringing up of its little craters of sand and earth to form a sort of top dressing or soil mulch. The other two native garden and lawn ants have similar habits.

In this same class of outdoor ants which may occasionally find entrance into houses should be included the common European meadow ant,[2] one of the few Old-World ants of temperate regions which has been brought to America. This ant has readily accommodated itself to conditions of urban existence in the eastern United States, and its colonies occur in lawns and often under pavements, or beneath flagging or stones in yards. These colonies are often large and may frequently be uncovered in masses of a quart or more, on turning over stones in yards or lifting flagging in paths.

HABITS AND LIFE HISTORY OF HOUSE ANTS.

In habits and life history these ants are all much alike and, in common with other social insects, present that most complex and interesting phase of communal life, with its accompanying division of labor and diversity of forms of individuals, all working together in the most perfect harmony and accord. The ants ordinarily seen in houses are neuters or workers. In the colony itself, if it be discovered and opened, will be found also the larger wingless females and,

[1] *Lasius niger* L. var. *americanus* Emery.
[2] *Tetramorium caespitum* L.

at the proper season, the winged males and females. During most of the year, however, the colony consists almost exclusively of workers, with one or more perfect wingless females. Winged males and females are produced during the summer and almost immediately take their nuptial flight. The males soon perish, and the females shortly afterward tear off their own wings, which are but feebly attached, and set about the establishment of new colonies. The eggs, which are produced in extraordinary numbers by the females or "queen" ants, are very minute, oval, whitish objects, and are cared for by the workers, the young larvæ being fed in very much the same way as in the colonies of the hive bee. The so-called ant eggs, in the popular conception, are not eggs at all, but the white larvæ and pupæ, and those of females or males are much larger than those of the workers and many times larger than the true eggs.

MEANS OF CONTROLLING HOUSE AND LAWN ANTS.

DESTRUCTION OF HOUSE COLONIES.

The distinctively house-inhabiting ants, such as the little red or Pharaoh's ant, and other imported species nesting in the woodwork, masonry, or articles of furniture, etc., are often very difficult to eradicate because of their inaccessibility. If the nest can be located by following the workers back to their point of disappearance, the inmates of the nest, if near by, may sometimes be reached by injecting a little bisulphid of carbon, kerosene, or gasoline into the opening by means of an oil can or small syringe. *In the use of these substances, naturally, precautions should be taken to see that no fire is present, as all of them are inflammable.* If the nest is under flooring it may sometimes be gotten at by removing a section; but, as a rule, unless the colony can thus be reached and destroyed other measures are of only temporary avail if food or other conditions continue to attract the ants and facilitate their continued breeding in the house.

The removal, therefore, of the attracting substances in houses, wherever practical, should be the first step. Ants are attracted by food material, especially cake, bread, sugar, meat, and like substances, in pantries and elsewhere, and the nuisance of their presence can be largely limited by promptly cleaning up all food scattered by children and by keeping in the pantry or storeroom all food supplies which may attract ants, in ant-proof metal containers or in ice boxes, and limiting the amount of such articles as far as possible to daily needs.

That it is possible to drive ants away from household supplies by the use of repellents, particularly camphor and naphthalene flakes or powdered moth balls, has been asserted. The use of most of such repellent substances, however, in connection with food supplies, is impracticable, and careful tests have indicated that such substances

have only slightly repellent properties and bring comparatively little benefit.

The collection of ants by the use of attractive baits is frequently recommended. Perhaps as convenient a bait as any consists of small sponges moistened with sweetened water and placed in situations where they can be easily reached by the ants. These sponges may be collected several times daily and the ants swarming on them destroyed by immersion in hot water. It is reported also that a sirup made by dissolving borax and sugar in boiling water and distributed on sponges will effect the destruction of the ants in numbers. Remedies of this kind, however, are of doubtful value. They may be useful at the outset when the colonies are few and small and when most of the individuals may, by these means, be secured and destroyed. Very frequently, however, the distribution of such baits will simply result in a more wide exploitation of a good forage ground and an actual increase of the ant nuisance.

A more efficient remedy, where it can be safely used, is a sirup poisoned with arsenate of soda, the idea being that the ants will collect this poison sirup and convey it to their nests, so that not only the ants which collect the sirup are ultimately killed, but the inmates of nests feeding on it also succumb. The formula for the preparation of this sirup is as follows: One pound of sugar dissolved in a quart of water, to which should be added 125 grains of arsenate of soda. The mixture should be boiled and strained, and on cooling is used with sponges, as already described. The addition of a small amount of honey is said to add to the attractiveness to ants of this mixture. *Naturally the greatest precautions should be taken in preparing this sirup and in safeguarding it afterwards to prevent its being the cause of poisoning to human beings or domestic animals.* This method of control has been tested for three years by an expert[1] of the Bureau of Entomology of this department and has given very satisfactory results. Similar success with it has been reported by others, including persons engaged professionally in insect extermination. A related formula experimentally worked out for the Argentine ant will appear in a special bulletin on this insect.[2] This formula is as follows:

Granulated sugar	15 pounds.
Water	7½ pints.
Tartaric acid (crystallized)	¼ ounce.

Boil these ingredients together slowly for 30 minutes and allow them to cool. Then slowly dissolve three-fourths ounce sodium arsenite ($NaAsO_2$) in one-half pint of hot water. Allow this to cool, then add it to the sirup, stirring thoroughly. Add 1½ pounds of pure honey to the sirup and the mixture is ready for use.

[1] C. H. Popenoe.

[2] Barber, E. R. The Argentine ant: Distribution and control. U. S. Dept. Agr. Bul. 377.

DESTRUCTION OF LAWN ANTS.

In the case of lawn ants where only a small area with few nests are concerned, drenching the nests with boiling water or injecting a small quantity of kerosene or coal oil will be effective, and similar treatment will apply to nests between or beneath paving stones.

Another simple means of destroying such ants in lawns of small extent is to spray the lawns with kerosene emulsion (see Farmers' Bulletin 127) or with a very strong soap wash, prepared by dissolving any common laundry soap in water at the rate of from half a pound to a pound of soap to the gallon of water.

An effective control method for larger ant colonies is to inject into the nest a quantity of bisulphide of carbon, a chemical which can be purchased at any drug store. This substance can be placed in the nest with an oil can or small syringe, the quantity varying from half an ounce for a very tiny nest to 2 or 3 ounces or more, depending on the size of the nest. An oil can or syringe with a long spout is convenient for this purpose, as this can be inserted into the nests and the liquid injected without its being too near the operator's nose. To facilitate entrance of the chemical, the ant hole can be enlarged with a sharp stick or iron rod. The depth of the injection will depend on the size of the nest—from an inch or two to greater depths. After injection of the bisulphide of carbon the entrance opening should be closed by pressure of the foot to retain the bisulphide, which will then penetrate slowly throughout the underground channels of the nest and kill the inmates. The efficiency of this remedy is increased by covering the nest immediately after the injection with a wet blanket or other heavy cloth, to better retain the fumes of the chemical. Bisulphide of carbon has a very disagreeable odor, but its fumes are not poisonous to higher animals. *As already noted, it should be kept away from fire, as its fumes are inflammable and may explode if ignited, much like gasoline vapor.*

PROTECTION FROM THE CARPENTER ANT.

The method of protection from damage by the carpenter ant is practically the same as that employed to protect from termites,[1] namely, preventing the ants from gaining access to foundation timbers by using in the foundations only timbers which have been previously impregnated with creosote. Ants infesting house timbers which have not been so protected may sometimes be reached and killed by the abundant use of kerosene injected by means of a syringe or, where the timbers are accessible, by spraying or soaking them with kerosene. All timbers which have been mined and weakened should, however, be replaced with timbers protected with creosote.

[1] A special publication on white ants (Department Bulletin No. 333, prepared in the Bureau of Entomology) has been issued by the Department of Agriculture and may be had on application.

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